

CLAIMS

What is claimed is:

- 1) A computer system operation method for facilitating viewing of a computer generated model on a display, the method comprising:
selecting a projection plane for a three dimensional model; and
displaying a two dimensional visualization of a projection of the model in the projection plane, wherein the projection plane is the plane of the display.
- 2) The method of claim 1 wherein the display of the two dimensional visualization is limited to pixel data.
- 3) The method of claim 1 additionally comprising activation of a manipulator tool button to cause the displaying of the two dimensional model.
- 4) The method of claim 1 additionally comprising activation of a manipulator quadrant device to modify the projection plane.
- 5) A software control method comprising:
displaying a graphical user interface manipulator comprising quadrants, wherein each quadrant comprises a programmable interactive device;
associating each quadrant with a direction in relation to an orthogonal axis;
activating an interactive device comprising a quadrant; and
rotating a projection plane of a computer generated model a predetermined number of degrees in a predetermined direction around an orthogonal axis associated with a selected quadrant.
- 6) The software control method of claim 5 additionally comprising:
displaying a programmable interactive button;
activating the programmable interactive button; and
displaying a visualization of a computer generated model responsive to activation of the programmable interactive button.
- 7) A graphical manipulator software tool comprising:
a graphical user interface object comprising quadrants, wherein each quadrant is associated with a direction in relation to an orthogonal axis; and

a programmable interactive device corresponding with a quadrant and responsive to activation by a pointing device, wherein activation of the interactive device causes a projection plane of a computer generated model to rotate a predetermined number of degrees in a predetermined direction.

- 8) A projection plane manipulator software tool comprising:
 - a user interactive device tracking the circumference of a circle displayed on a computer screen with a computer generated model, wherein selecting the interactive device and rotating it in a clockwise or counter-clockwise direction will cause a projection plane of the computer generated model to rotate about an axis which is perpendicular to the projection screen.
- 9) The projection plane manipulator software tool of claim 8 additionally comprising:
 - an interactive menu for selecting a mode of operation governing the rotation of the interactive device about the circumference of the circle.
- 10) The projection manipulator software tool of claim 9 wherein the mode of operation comprises free hand rotation.
- 11) The projection manipulator software tool of claim 9 wherein the mode of operation comprises incremental rotation.
- 12) The projection manipulator software tool of claim 9 wherein the mode of operation comprises entering an angle of rotation.
- 13) A projection creation software tool comprising:
 - a computer generated model displayed on a computer display;
 - a programmable user interactive device, wherein activation of the interactive device displays a visualization of the projection of the model with a projection plane equal to the plane of the computer display.
- 14) The projection creation software tool of claim 13 wherein activation of the user interactive device is accomplished by clicking a pointing device controlling a cursor while the cursor is positioned over the interactive device.
- 15) The projection creation software tool of claim 13 wherein the user interactive device is incorporated into a graphical manipulator software tool.

- 16) A method of creating an isometric view of a computer generated model of an object, the method comprising:
 - selecting an initial projection plane;
 - activating a user interactive device on a graphical view manipulator causing the projection plane to rotate a first amount not equal to 90° around an axis that is perpendicular to the current projection plane;
 - activating a first quadrant on a graphical view manipulator causing the projection plane to rotate by 90° around one of two orthogonal axis of the model;
 - activating a second user interactive device on a graphical view manipulator causing the projection plane to rotate a second amount not equal to 90° around an axis that is perpendicular to the current projection plane; and
 - activating a second quadrant on a graphical view manipulator causing the projection plane to rotate by 90° around a second of two orthogonal axis of the model.
- 16) The method of claim 15 wherein the first interactive device is a rotational arrow interactive device.
- 17) The method of claim 15 wherein the first interactive device is a manipulator pin.
- 18) An interactive software tool comprising:
 - a graphical user interface object comprising quadrants, wherein each quadrant is associated with a direction in relation to an orthogonal axis;
 - a first programmable interactive device corresponding with a quadrant and responsive to activation by a pointing device, wherein activation of the first interactive programmable interactive device causes a projection plane of a computer generated model to rotate a predetermined number of degrees in a predetermined direction;
 - a second programmable interactive device tracking the circumference of a circle displayed on a computer screen with a computer generated model, wherein selecting the second interactive device and rotationally moving the second interactive device will cause a projection plane of the computer generated model to rotate about an axis which is perpendicular to the projection screen;

an interactive menu for selecting a mode of operation governing the rotation of the interactive device about the circumference of the circle; and a third interactive device displayed on the computer display, wherein activation of the third interactive device displays a visualization of the projection of the model with a projection plane equal to the plane of the computer display.

19) Computer executable code stored on a computer readable medium, the code causing a computer to take steps comprising:
selecting a projection plane for a three dimensional model; and
displaying a two dimensional visualization of a projection of the model in the projection plane, wherein the projection plane is the plane of the display.

20) Computer executable code stored on a computer readable medium, the code causing a computer to take steps comprising:
selecting an initial projection plane;
activating a user interactive device on a graphical view manipulator causing the projection plane to rotate a first amount not equal to 90° around an axis that is perpendicular to the current projection plane;
activating a first quadrant on a graphical view manipulator causing the projection plane to rotate by 90° around one of two orthogonal axis of the model;
activating a second user interactive device on a graphical view manipulator causing the projection plane to rotate a second amount not equal to 90° around an axis that is perpendicular to the current projection plane; and
activating a second quadrant on a graphical view manipulator causing the projection plane to rotate by 90° around a second of two orthogonal axis of the model.